

Ser. No. 08/470,489

42°C below the melting temperature of the probe, 20°C below the melting temperature of the probe, and 3°C below the melting temperature of the probe, wherein said probe comprises an HIV-2 nucleic acid molecule, which hybridizes to HIV-2ROD genomic DNA under hybridization conditions selected from the group consisting of 42°C below the melting temperature of the probe, 20°C below the melting temperature of the probe, and 3°C below the melting temperature of the probe;

b) washing the resulting hybrid under conditions selected from the group consisting of 42°C below the melting temperature of the probe, 20°C below the melting temperature of the probe, and 3°C below the melting temperature of the probe; and  
c) detecting said hybrid.

91. The method of claim 90, wherein said probe comprises cDNA.

92. A method of detecting HIV-2 retrovirus nucleic acid in a biological sample, said method comprising:

a) contacting said sample with an HIV-2 specific probe under hybridization conditions selected from the group consisting of hybridization conditions of 42°C below the melting temperature of the probe, 20°C below the melting temperature of the probe, and 3°C below the melting temperature of the probe,

wherein said probe comprises an HIV-2 nucleic acid molecule obtained from nucleotides 1-380 of the U3/R region of HIV-2, nucleotides 1-1566 of the gag gene of

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HIV-2, nucleotides 1114-1524 of the *gag* gene, nucleotides 1-405 of the *gag* gene, nucleotides 406-1155 of the *gag* gene, or nucleotides 1-2673 of the *env* gene of HIV-2, and

wherein said probe hybridizes to HIV-2ROD genomic DNA under hybridization conditions selected from the group consisting of 42°C below the melting temperature of the probe, 20°C below the melting temperature of the probe, and 3°C below the melting temperature of the probe;

b) washing the resulting hybrid under conditions selected from the group consisting of 42°C below the melting temperature of the probe, 20°C below the melting temperature of the probe, and 3°C below the melting temperature of the probe; and  
c) detecting said hybrid.

93. The method of claim 92, wherein said probe is obtained from the following sequence:

GTGGAAGGCG	AGACTGAAAG	CAAGAGGAAT	ACCATTTAGT	TAAAGGACAG
GAACAGCTAT	ACTTGGTCAG	GGCAGGAAGT	AACTAACAGA	AACAGCTGAG
ACTGCAGGGA	CTTCCAGAA	GGGGCTGTAA	CCAAGGGAGG	GACATGGGAG
GAGCTGGTGG	GGAACGCCTC	ATATTCTCTG	TATAATATAC	CCGCTGCTTG
CATTGTACTT	CAGTCGCTCT	GCGGAGAGGC	TGGCAGATTG	AGCCCTGGAG
GATCTCTCCA	GCACTAGACG	GATGAGCCTG	GGTGCCCTGC	TAGACTCTCA
CCAGCACTTG	GCCGGTGCTG	GCAGACGGCC	CCACGCTTGC	CTGCTTAAAA
ACCTTCCTTA	ATAAAGCTGC	AGTAGAAGCA.		

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94. The method of claim 92, wherein said probe encodes the following amino acid sequence:

Met Gly Ala Arg Asn Ser Val Leu Arg Gly Lys Lys Ala Asp Glu Leu Glu Arg Ile Arg Leu Arg Pro Gly Gly Lys Lys Tyr Arg Leu Lys His Ile Val Trp Ala Ala Asn Lys Leu Asp Arg Phe Gly Leu Ala Glu Ser Leu Leu Glu Ser Lys Glu Gly Cys Gln Lys Ile Leu Thr Val Leu Asp Pro Met Val Pro Thr Gly Ser Glu Asn Leu Lys Ser Leu Phe Asn Thr Val Cys Val Ile Trp Cys Ile His Ala Glu Glu Lys Val Lys Asp Thr Glu Gly Ala Lys Gln Ile Val Arg Arg His Leu Val Ala Glu Thr Gly Thr Ala Glu Lys Met Pro Ser Thr Ser Arg Pro Thr Ala Pro Ser Ser Glu Lys Gly Asn Tyr Pro Val Gln His Val Gly Gly Asn Tyr Thr His Ile Pro Leu Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Leu Val Glu Glu Lys Lys Phe Gly Ala Glu Val Val Pro Gly Phe Gln Ala Leu Ser Glu Gly Cys Thr Pro Tyr Asp Ile Asn Gln Met Leu Asn Cys Val Gly Asp His Gln Ala Ala Met Gln Ile Ile Arg Glu Ile Ile Asn Glu Glu Ala Ala Glu Trp Asp Val Gln His Pro Ile Pro Gly Pro Leu Pro Ala Gly Gln Leu Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr Val Glu Glu Gln Ile Gln Trp Met Phe Arg Pro Gln Asn Pro Val Pro Val Gly Asn Ile Tyr Arg Arg Trp Ile Gln Ile Gly Leu Gln Lys Cys Val Arg Met Tyr Asn Pro Thr Asn Ile Leu Asp Ile Lys Gln Gly Pro Lys Glu Pro Phe Gln Ser Tyr Val Asp Arg Phe Tyr Lys Ser Leu Arg Ala Glu Gln Thr Asp Pro Ala Val

Lys Asn Trp Met Thr Gln Thr Leu Leu Val Gln Asn Ala Asn Pro  
Asp Cys Lys Leu Val Leu Lys Gly Leu Gly Met Asn Pro Thr Leu  
Glu Glu Met Leu Thr Ala Cys Gln Gly Val Gly Pro Gly Gln  
Lys Ala Arg Leu Met Ala Glu Ala Leu Lys Glu Val Ile Gly Pro  
Ala Pro Ile Pro Phe Ala Ala Ala Gln Gln Arg Lys Ala Phe Lys  
Cys Trp Asn Cys Gly Lys Glu Gly His Ser Ala Arg Gln Cys Arg  
Ala Pro Arg Arg Gln Gly Cys Trp Lys Cys Gly Lys Pro Gly His  
Ile Met Thr Asn Cys Pro Asp Arg Gln Ala Gly Phe Leu Gly Leu  
Gly Pro Trp Gly Lys Lys Pro Arg Asn Phe Pro Val Ala Gln Val  
Pro Gln Gly Leu Thr Pro Thr Ala Pro Pro Val Asp Pro Ala Val  
Asp Leu Leu Glu Lys Tyr Met Gln Gln Gly Lys Arg Gln Arg Glu  
Gln Arg Glu Arg Pro Tyr Lys Glu Val Thr Glu Asp Leu Leu His  
Leu Glu Gln Gly Glu Thr Pro Tyr Arg Glu Pro Pro Thr Glu Asp  
Leu Leu His Leu Asn Ser Leu Phe Gly Lys Asp Gln.

95. The method of claim 92, wherein said probe encodes the following  
amino acid sequence:

Arg Lys Ala Phe Lys  
Cys Trp Asn Cys Gly Lys Glu Gly His Ser Ala Arg Gln Cys Arg  
Ala Pro Arg Arg Gln Gly Cys Trp Lys Cys Gly Lys Pro Gly His  
Ile Met Thr Asn Cys Pro Asp Arg Gln Ala Gly Phe Leu Gly Leu  
Gly Pro Trp Gly Lys Lys Pro Arg Asn Phe Pro Val Ala Gln Val  
Pro Gln Gly Leu Thr Pro Thr Ala Pro Pro Val Asp Pro Ala Val  
Asp Leu Leu Glu Lys Tyr Met Gln Gln Gly Lys Arg Gln Arg Glu

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Gln Arg Glu Arg Pro Tyr Lys Glu Val Thr Glu Asp Leu Leu His  
Leu Glu Gln Gly Glu Thr Pro Tyr Arg Glu Pro Pro Thr Glu Asp  
Leu Leu His Leu Asn Ser Leu Phe Gly Lys Asp Gln.

**96. The method of claim 92, wherein said probe encodes the following amino acid sequence:**

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Met Gly Ala Arg Asn Ser Val Leu Arg Gly Lys Lys Ala Asp Glu  
Leu Glu Arg Ile Arg Leu Arg Pro Gly Gly Lys Lys Tyr Arg  
Leu Lys His Ile Val Trp Ala Ala Asn Lys Leu Asp Arg Phe Gly  
Leu Ala Glu Ser Leu Leu Glu Ser Lys Glu Gly Cys Gln Lys Ile  
Leu Thr Val Leu Asp Pro Met Val Pro Thr Gly Ser Glu Asn Leu  
Lys Ser Leu Phe Asn Thr Val Cys Val Ile Trp Cys Ile His Ala  
Glu Glu Lys Val Lys Asp Thr Glu Gly Ala Lys Gln Ile Val Arg  
Arg His Leu Val Ala Glu Thr Gly Thr Ala Glu Lys Met Pro Ser  
Thr Ser Arg Pro Thr Ala Pro Ser Ser Glu Lys Gly Gly Asn Tyr.

**97. The method of claim 92, wherein said probe encodes the following amino acid sequence:**

Pro Val Gln His Val Gly Gly Asn Tyr Thr His Ile Pro Leu Ser  
Pro Arg Thr Leu Asn Ala Trp Val Lys Leu Val Glu Glu Lys Lys  
Phe Gly Ala Glu Val Val Pro Gly Phe Gln Ala Leu Ser Glu Gly  
Cys Thr Pro Tyr Asp Ile Asn Gln Met Leu Asn Cys Val Gly Asp  
His Gln Ala Ala Met Gln Ile Ile Arg Glu Ile Ile Asn Glu Glu  
Ala Ala Glu Trp Asp Val Gln His Pro Ile Pro Gly Pro Leu Pro  
Ala Gly Gln Leu Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr

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Thr Ser Thr Val Glu Glu Gln Ile Gln Trp Met Phe Arg Pro Gln  
Asn Pro Val Pro Val Gly Asn Ile Tyr Arg Arg Trp Ile Gln Ile  
Gly Leu Gln Lys Cys Val Arg Met Tyr Asn Pro Thr Asn Ile Leu  
Asp Ile Lys Gln Gly Pro Lys Glu Pro Phe Gln Ser Tyr Val Asp  
Arg Phe Tyr Lys Ser Leu Arg Ala Glu Gln Thr Asp Pro Ala Val  
Lys Asn Trp Met Thr Gln Thr Leu Leu Val Gln Asn Ala Asn Pro  
Asp Cys Lys Leu Val Leu Lys Gly Leu Gly Met Asn Pro Thr Leu  
Glu Glu Met Leu Thr Ala Cys Gln Gly Val Gly Pro Gly Gln  
Lys Ala Arg Leu Met Ala Glu Ala Leu Lys Glu Val Ile Gly Pro  
Ala Pro Ile Pro Phe Ala Ala Ala Gln Gln.

98. The method of claim 92, wherein said probe encodes the following amino acid sequence:

Met Met Asn Gln Leu Leu Ile Ala Ile Leu Leu Ala Ser Ala Cys  
Leu Val Tyr Cys Thr Gln Tyr Val Thr Val Phe Tyr Gly Val Pro  
Thr Trp Lys Asn Ala Thr Ile Pro Leu Phe Cys Ala Thr Arg Asn  
Arg Asp Thr Trp Gly Thr Ile Gln Cys Leu Pro Asp Asn Asp Asp  
Tyr Gln Glu Ile Thr Leu Asn Val Thr Glu Ala Phe Asp Ala Trp  
Asn Asn Thr Val Thr Glu Gln Ala Ile Glu Asp Val Trp His Leu  
Phe Glu Thr Ser Ile Lys Pro Cys Val Lys Leu Thr Pro Leu Cys  
Val Ala Met Lys Cys Ser Ser Thr Glu Ser Ser Thr Gly Asn Asn  
Thr Thr Ser Lys Ser Thr Ser Thr Thr Thr Pro Thr Asp  
Gln Glu Gln Glu Ile Ser Glu Asp Thr Pro Cys Ala Arg Ala Asp  
Asn Cys Ser Gly Leu Gly Glu Glu Thr Ile Asn Cys Gln Phe

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Asn Met Thr Gly leu Glu Arg Asp Lys Lys Lys Gln Tyr Asn Glu  
Thr Trp Tyr Ser Lys Asp Val Val Cys Glu Thr Asn Asn Ser Thr  
Asn Gln Thr Gln Cys Tyr Met Asn His Cys Asn Thr Ser Val Ile  
Thr Glu Ser Cys Asp Lys His Tyr Trp Asp Ala Ile Arg Phe Arg  
Tyr Cys Ala Pro Pro Gly Tyr Ala Leu Leu Arg Cys Asn Asp Thr  
Asn Tyr Ser Gly Phe Ala Pro Asn Cys Ser Lys Val Val Ala Ser  
Thr Cys Thr Arg Met Met Glu Thr Gln Thr Ser Thr Trp Phe Gly  
Phe Asn Gly Thr Arg Ala Glu Asn Arg Thr Tyr Ile Tyr Trp His  
Gly Arg Asp Asn Arg Thr Ile Ile Ser Leu Asn Lys Tyr Tyr Asn  
Leu Ser Leu His Cys Lys Arg Pro Gly Asn Lys Thr Val Lys Gln  
Ile Met Leu Met Ser Gly His Val Phe His Ser His Tyr Gln Pro  
Ile Asn Lys Arg Pro Arg Gln Ala Trp Cys Trp Phe Lys Gly Lys  
Trp Lys Asp Ala Met Gln Glu Val Lys Thr Leu Ala Lys His Pro  
Arg Tyr Arg Gly Thr Asn Asp Thr Arg Asn Ile Ser Phe Ala Ala  
Pro Gly Lys Gly Ser Asp Pro Glu Val Ala Tyr Met Trp Thr Asn  
Cys Arg Gly Glu Phe Leu Tyr Cys Asn Met Thr Trp Phe Leu Asn  
Trp Ile Glu Asn Lys Thr His Arg Asn Tyr Ala Pro Cys His Ile  
Lys Gln Ile Ile Asn Thr Trp His Lys Val Gly Arg Asn Val Tyr  
Leu Pro Pro Arg Glu Gly Glu Leu Ser Cys Asn Ser Thr Val Thr  
Ser Ile Ile Ala Asn Ile Asp Trp Gln Asn Asn Gln Thr Asn  
Ile Thr Phe Ser Ala Glu Val Ala Glu Leu Tyr Arg Leu Glu Leu  
Gly Asp Tyr Lys Leu Val Glu Ile Thr Pro Ile Gly Phe Ala Pro  
Thr Lys Glu Lys Arg Tyr Ser Ser Ala His Gly Arg His Thr Arg

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Gly Val Phe Val Leu Gly Phe Leu Gly Phe Leu Ala Thr Ala Gly  
Ser Ala Met Gly Ala Arg Ala Ser Leu Thr Val Ser Ala Gln Ser  
Arg Thr Leu Leu Ala Gly Ile Val Gln Gln Gln Gln Gln Leu Leu  
Asp Val Val Lys Arg Gln Gln Glu Leu Leu Arg Leu Thr Val Trp  
Gly Thr Lys Asn Leu Gln Ala Arg Val Thr Ala Ile Glu Lys Tyr  
Leu Gln Asp Gln Ala Arg Leu Asn Ser Trp Gly Cys Ala Phe Arg  
Gln Val Cys His Thr Thr Val Pro Trp Val Asn Asp Ser Leu Ala  
Pro Asp Trp Asp Asn Met Thr Trp Gln Glu Trp Glu Lys Gln Val  
Arg Tyr Leu Glu Ala Asn Ile Ser Lys Ser Leu Glu Gln Ala Gln  
Ile Gln Gln Glu Lys Asn Met Tyr Glu Leu Gln Lys Leu Asn Ser  
Trp Asp Ile Phe Gly Asn Trp Phe Asp Leu Thr Ser Trp Val Lys  
Tyr Ile Gln Tyr Gly Val Leu Ile Ile Val Ala Val Ile Ala Leu  
Arg Ile Val Ile Tyr Val Val Gln Met Leu Ser Arg Leu Arg Lys  
Gly Tyr Arg Pro Val Phe Ser Ser Pro Pro Gly Tyr Ile Gln Gln  
Ile His Ile His Lys Asp Arg Gly Gln Pro Ala Asn Glu Glu Thr  
Glu Glu Asp Gly Gly Ser Asn Gly Gly Asp Arg Tyr Trp Pro Trp  
Pro Ile Ala Tyr Ile His Phe Leu Ile Arg Gln Leu Ile Arg Leu  
Leu Thr Arg Leu Tyr Ser Ile Cys Arg Asp Leu Leu Ser Arg Ser  
Phe Leu Thr Leu Gln Leu Ile Tyr Gln Asn Leu Arg Asp Trp Leu  
Arg Leu Arg Thr Ala Phe Leu Gln Tyr Gly Cys Glu Trp Ile Gln  
Glu Ala Phe Gln Ala Ala Ala Arg Ala Thr Arg Glu Thr Leu Ala  
Gly Ala Cys Arg Gly Leu Trp Arg Val Leu Glu Arg Ile Gly Arg

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Gly Ile Leu Ala Val Pro Arg Arg Ile Arg Gln Gly Ala Glu Ile  
Ala Leu Leu \*\*\* Gly Thr Ala Val Ser Ala Gly Arg Leu Tyr Glu  
Tyr Ser Met Glu Gly Pro Ser Ser Arg Lys Gly Glu Lys Phe Val  
Gln Ala Thr Lys Tyr Gly,

wherein \*\*\* indicates a stop codon.

99. A method of producing an HIV-2 specific hybridization probe for HIV-2 retrovirus nucleic acid, said method comprising:

a) preparing a nucleic acid insert, which hybridizes to HIV-2 ROD genomic DNA under hybridization conditions selected from the group consisting of 42°C below the melting temperature of the insert, 20°C below the melting temperature of the insert, and 3°C below the melting temperature of the insert;

b) introducing the insert into a recombinant cloning vector;

c) introducing said vector into a competent cellular host; and

d) recovering the DNA recombinants.

100. The method of claim 99, wherein said probe comprises cDNA.

101. A method of producing an HIV-2 specific hybridization probe for HIV-2 retrovirus nucleic acid, said method comprising:

a) preparing a nucleic acid insert, wherein said insert is obtained from nucleotides 1-380 of the U3/R region of HIV-2, nucleotides 1-1566 of the gag gene of HIV-2, nucleotides 1114-1524 of the gag gene, nucleotides 1-405 of the gag gene, nucleotides 406-1155 of the gag gene, or nucleotides 1-2673 of

the *env* gene of HIV-2, and wherein said insert hybridizes to HIV-2ROD genomic DNA under hybridization conditions selected from the group consisting of 42°C below the melting temperature of the insert, 20°C below the melting temperature of the insert, and 3°C below the melting temperature of the insert;

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- b) introducing the insert into a recombinant cloning vector;
- c) introducing said vector into a competent cellular host; and
- d) recovering the DNA recombinants.

102. The method of claim 101, wherein said insert is obtained from the following sequence:

GTGGAAGGCG AGACTGAAAG CAAGAGGAAT ACCATTTAGT TAAAGGACAG  
GAACAGCTAT ACTTGGTCAG GGCAGGAAGT AACTAACAGA AACAGCTGAG  
ACTGCAGGGA CTTTCCAGAA GGGGCTGTAA CCAAGGGAGG GACATGGGAG  
GAGCTGGTGG GGAACGCCTC ATATTCTCTG TATAATATAC CCGCTGCTTG  
CATTGTACTT CAGTCGCTCT GC GGAGAGGC TGGCAGATTG AGCCCTGGAG  
GATCTCTCCA GCACTAGACG GATGAGCCTG GGTGCCCTGC TAGACTCTCA  
CCAGCACTTG GCCGGTGCTG GCAGACGGCC CCACGCTTGC CTGCTTAAAA  
ACCTTCCTTA ATAAAGCTGC AGTAGAAGCA.

103. The method of claim 101, wherein said insert encodes the following amino acid sequence:

Met Gly Ala Arg Asn Ser Val Leu Arg Gly Lys Lys Ala Asp Glu  
Leu Glu Arg Ile Arg Leu Arg Pro Gly Gly Lys Lys Tyr Arg  
Leu Lys His Ile Val Trp Ala Ala Asn Lys Leu Asp Arg Phe Gly

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Leu Ala Glu Ser Leu Leu Glu Ser Lys Glu Gly Cys Gln Lys Ile  
Leu Thr Val Leu Asp Pro Met Val Pro Thr Gly Ser Glu Asn Leu  
Lys Ser Leu Phe Asn Thr Val Cys Val Ile Trp Cys Ile His Ala  
Glu Glu Lys Val Lys Asp Thr Glu Gly Ala Lys Gln Ile Val Arg  
Arg His Leu Val Ala Glu Thr Gly Thr Ala Glu Lys Met Pro Ser  
Thr Ser Arg Pro Thr Ala Pro Ser Ser Glu Lys Gly Gly Asn Tyr  
Pro Val Gln His Val Gly Gly Asn Tyr Thr His Ile Pro Leu Ser  
Pro Arg Thr Leu Asn Ala Trp Val Lys Leu Val Glu Glu Lys Lys  
Phe Gly Ala Glu Val Val Pro Gly Phe Gln Ala Leu Ser Glu Gly  
Cys Thr Pro Tyr Asp Ile Asn Gln Met Leu Asn Cys Val Gly Asp  
His Gln Ala Ala Met Gln Ile Ile Arg Glu Ile Ile Asn Glu Glu  
Ala Ala Glu Trp Asp Val Gln His Pro Ile Pro Gly Pro Leu Pro  
Ala Gly Gln Leu Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr  
Thr Ser Thr Val Glu Glu Gln Ile Gln Trp Met Phe Arg Pro Gln  
Asn Pro Val Pro Val Gly Asn Ile Tyr Arg Arg Trp Ile Gln Ile  
Gly Leu Gln Lys Cys Val Arg Met Tyr Asn Pro Thr Asn Ile Leu  
Asp Ile Lys Gln Gly Pro Lys Glu Pro Phe Gln Ser Tyr Val Asp  
Arg Phe Tyr Lys Ser Leu Arg Ala Glu Gln Thr Asp Pro Ala Val  
Lys Asn Trp Met Thr Gln Thr Leu Leu Val Gln Asn Ala Asn Pro  
Asp Cys Lys Leu Val Leu Lys Gly Leu Gly Met Asn Pro Thr Leu  
Glu Glu Met Leu Thr Ala Cys Gln Gly Val Gly Pro Gly Gln  
Lys Ala Arg Leu Met Ala Glu Ala Leu Lys Glu Val Ile Gly Pro  
Ala Pro Ile Pro Phe Ala Ala Gln Gln Arg Lys Ala Phe Lys

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Cys Trp Asn Cys Gly Lys Glu Gly His Ser Ala Arg Gln Cys Arg  
Ala Pro Arg Arg Gln Gly Cys Trp Lys Cys Gly Lys Pro Gly His  
Ile Met Thr Asn Cys Pro Asp Arg Gln Ala Gly Phe Leu Gly Leu  
Gly Pro Trp Gly Lys Lys Pro Arg Asn Phe Pro Val Ala Gln Val  
Pro Gln Gly Leu Thr Pro Thr Ala Pro Pro Val Asp Pro Ala Val  
Asp Leu Leu Glu Lys Tyr Met Gln Gln Gly Lys Arg Gln Arg Glu  
Gln Arg Glu Arg Pro Tyr Lys Glu Val Thr Glu Asp Leu Leu His  
Leu Glu Gln Gly Glu Thr Pro Tyr Arg Glu Pro Pro Thr Glu Asp  
Leu Leu His Leu Asn Ser Leu Phe Gly Lys Asp Gln.

104. The method of claim 101, wherein said insert encodes the following amino acid sequence:

Arg Lys Ala Phe Lys  
Cys Trp Asn Cys Gly Lys Glu Gly His Ser Ala Arg Gln Cys Arg  
Ala Pro Arg Arg Gln Gly Cys Trp Lys Cys Gly Lys Pro Gly His  
Ile Met Thr Asn Cys Pro Asp Arg Gln Ala Gly Phe Leu Gly Leu  
Gly Pro Trp Gly Lys Lys Pro Arg Asn Phe Pro Val Ala Gln Val  
Pro Gln Gly Leu Thr Pro Thr Ala Pro Pro Val Asp Pro Ala Val  
Asp Leu Leu Glu Lys Tyr Met Gln Gln Gly Lys Arg Gln Arg Glu  
Gln Arg Glu Arg Pro Tyr Lys Glu Val Thr Glu Asp Leu Leu His  
Leu Glu Gln Gly Glu Thr Pro Tyr Arg Glu Pro Pro Thr Glu Asp  
Leu Leu His Leu Asn Ser Leu Phe Gly Lys Asp Gln.

105. The method of claim 101, wherein said insert encodes the following amino acid sequence:

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Met Gly Ala Arg Asn Ser Val Leu Arg Gly Lys Lys Ala Asp Glu  
Leu Glu Arg Ile Arg Leu Arg Pro Gly Gly Lys Lys Tyr Arg  
Leu Lys His Ile Val Trp Ala Ala Asn Lys Leu Asp Arg Phe Gly  
Leu Ala Glu Ser Leu Leu Glu Ser Lys Glu Gly Cys Gln Lys Ile  
Leu Thr Val Leu Asp Pro Met Val Pro Thr Gly Ser Glu Asn Leu  
Lys Ser Leu Phe Asn Thr Val Cys Val Ile Trp Cys Ile His Ala  
Glu Glu Lys Val Lys Asp Thr Glu Gly Ala Lys Gln Ile Val Arg  
Arg His Leu Val Ala Glu Thr Gly Thr Ala Glu Lys Met Pro Ser  
Thr Ser Arg Pro Thr Ala Pro Ser Ser Glu Lys Gly Gly Asn Tyr.

106. The method of claim 101, wherein said insert encodes the following amino acid sequence:

Pro Val Gln His Val Gly Gly Asn Tyr Thr His Ile Pro Leu Ser  
Pro Arg Thr Leu Asn Ala Trp Val Lys Leu Val Glu Glu Lys Lys  
Phe Gly Ala Glu Val Val Pro Gly Phe Gln Ala Leu Ser Glu Gly  
Cys Thr Pro Tyr Asp Ile Asn Gln Met Leu Asn Cys Val Gly Asp  
His Gln Ala Ala Met Gln Ile Ile Arg Glu Ile Ile Asn Glu Glu  
Ala Ala Glu Trp Asp Val Gln His Pro Ile Pro Gly Pro Leu Pro  
Ala Gly Gln Leu Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr  
Thr Ser Thr Val Glu Glu Gln Ile Gln Trp Met Phe Arg Pro Gln  
Asn Pro Val Pro Val Gly Asn Ile Tyr Arg Arg Trp Ile Gln Ile  
Gly Leu Gln Lys Cys Val Arg Met Tyr Asn Pro Thr Asn Ile Leu  
Asp Ile Lys Gln Gly Pro Lys Glu Pro Phe Gln Ser Tyr Val Asp  
Arg Phe Tyr Lys Ser Leu Arg Ala Glu Gln Thr Asp Pro Ala Val

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Lys Asn Trp Met Thr Gln Thr Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Leu Val Leu Lys Gly Leu Gly Met Asn Pro Thr Leu Glu Glu Met Leu Thr Ala Cys Gln Gly Val Gly Gly Pro Gly Gln Lys Ala Arg Leu Met Ala Glu Ala Leu Lys Glu Val Ile Gly Pro Ala Pro Ile Pro Phe Ala Ala Ala Gln Gln.

107. The method of claim 101, wherein said insert encodes the following amino acid sequence:

Met Met Asn Gln Leu Leu Ile Ala Ile Leu Leu Ala Ser Ala Cys Leu Val Tyr Cys Thr Gln Tyr Val Thr Val Phe Tyr Gly Val Pro Thr Trp Lys Asn Ala Thr Ile Pro Leu Phe Cys Ala Thr Arg Asn Arg Asp Thr Trp Gly Thr Ile Gln Cys Leu Pro Asp Asn Asp Asp Tyr Gln Glu Ile Thr Leu Asn Val Thr Glu Ala Phe Asp Ala Trp Asn Asn Thr Val Thr Glu Gln Ala Ile Glu Asp Val Trp His Leu Phe Glu Thr Ser Ile Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Ala Met Lys Cys Ser Ser Thr Glu Ser Ser Thr Gly Asn Asn Thr Thr Ser Lys Ser Thr Ser Thr Thr Thr Pro Thr Asp Gln Glu Gln Glu Ile Ser Glu Asp Thr Pro Cys Ala Arg Ala Asp Asn Cys Ser Gly Leu Gly Glu Glu Thr Ile Asn Cys Gln Phe Asn Met Thr Gly leu Glu Arg Asp Lys Lys Gln Tyr Asn Glu Thr Trp Tyr Ser Lys Asp Val Val Cys Glu Thr Asn Asn Ser Thr Asn Gln Thr Gln Cys Tyr Met Asn His Cys Asn Thr Ser Val Ile Thr Glu Ser Cys Asp Lys His Tyr Trp Asp Ala Ile Arg Phe Arg Tyr Cys Ala Pro Pro Gly Tyr Ala Leu Leu Arg Cys Asn Asp Thr

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Asn Tyr Ser Gly Phe Ala Pro Asn Cys Ser Lys Val Val Ala Ser  
Thr Cys Thr Arg Met Met Glu Thr Gln Thr Ser Thr Trp Phe Gly  
Phe Asn Gly Thr Arg Ala Glu Asn Arg Thr Tyr Ile Tyr Trp His  
Gly Arg Asp Asn Arg Thr Ile Ile Ser Leu Asn Lys Tyr Tyr Asn  
Leu Ser Leu His Cys Lys Arg Pro Gly Asn Lys Thr Val Lys Gln  
Ile Met Leu Met Ser Gly His Val Phe His Ser His Tyr Gln Pro  
Ile Asn Lys Arg Pro Arg Gln Ala Trp Cys Trp Phe Lys Gly Lys  
Trp Lys Asp Ala Met Gln Glu Val Lys Thr Leu Ala Lys His Pro  
Arg Tyr Arg Gly Thr Asn Asp Thr Arg Asn Ile Ser Phe Ala Ala  
Pro Gly Lys Gly Ser Asp Pro Glu Val Ala Tyr Met Trp Thr Asn  
Cys Arg Gly Glu Phe Leu Tyr Cys Asn Met Thr Trp Phe Leu Asn  
Trp Ile Glu Asn Lys Thr His Arg Asn Tyr Ala Pro Cys His Ile  
Lys Gln Ile Ile Asn Thr Trp His Lys Val Gly Arg Asn Val Tyr  
Leu Pro Pro Arg Glu Gly Glu Leu Ser Cys Asn Ser Thr Val Thr  
Ser Ile Ile Ala Asn Ile Asp Trp Gln Asn Asn Gln Thr Asn  
Ile Thr Phe Ser Ala Glu Val Ala Glu Leu Tyr Arg Leu Glu Leu  
Gly Asp Tyr Lys Leu Val Glu Ile Thr Pro Ile Gly Phe Ala Pro  
Thr Lys Glu Lys Arg Tyr Ser Ser Ala His Gly Arg His Thr Arg  
Gly Val Phe Val Leu Gly Phe Leu Gly Phe Leu Ala Thr Ala Gly  
Ser Ala Met Gly Ala Arg Ala Ser Leu Thr Val Ser Ala Gln Ser  
Arg Thr Leu Leu Ala Gly Ile Val Gln Gln Gln Gln Leu Leu  
Asp Val Val Lys Arg Gln Gln Glu Leu Leu Arg Leu Thr Val Trp  
Gly Thr Lys Asn Leu Gln Ala Arg Val Thr Ala Ile Glu Lys Tyr

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Leu Gln Asp Gln Ala Arg Leu Asn Ser Trp Gly Cys Ala Phe Arg  
Gln Val Cys His Thr Thr Val Pro Trp Val Asn Asp Ser Leu Ala  
Pro Asp Trp Asp Asn Met Thr Trp Gln Glu Trp Glu Lys Gln Val  
Arg Tyr Leu Glu Ala Asn Ile Ser Lys Ser Leu Glu Gln Ala Gln  
Ile Gln Gln Glu Lys Asn Met Tyr Glu Leu Gln Lys Leu Asn Ser  
Trp Asp Ile Phe Gly Asn Trp Phe Asp Leu Thr Ser Trp Val Lys  
Tyr Ile Gln Tyr Gly Val Leu Ile Val Ala Val Ile Ala Leu  
Arg Ile Val Ile Tyr Val Val Gln Met Leu Ser Arg Leu Arg Lys  
Gly Tyr Arg Pro Val Phe Ser Ser Pro Pro Gly Tyr Ile Gln Gln  
Ile His Ile His Lys Asp Arg Gly Gln Pro Ala Asn Glu Glu Thr  
Glu Glu Asp Gly Gly Ser Asn Gly Gly Asp Arg Tyr Trp Pro Trp  
Pro Ile Ala Tyr Ile His Phe Leu Ile Arg Gln Leu Ile Arg Leu  
Leu Thr Arg Leu Tyr Ser Ile Cys Arg Asp Leu Leu Ser Arg Ser  
Phe Leu Thr Leu Gln Leu Ile Tyr Gln Asn Leu Arg Asp Trp Leu  
Arg Leu Arg Thr Ala Phe Leu Gln Tyr Gly Cys Glu Trp Ile Gln  
Glu Ala Phe Gln Ala Ala Ala Arg Ala Thr Arg Glu Thr Leu Ala  
Gly Ala Cys Arg Gly Leu Trp Arg Val Leu Glu Arg Ile Gly Arg  
Gly Ile Leu Ala Val Pro Arg Arg Ile Arg Gln Gly Ala Glu Ile  
Ala Leu Leu \*\*\* Gly Thr Ala Val Ser Ala Gly Arg Leu Tyr Glu  
Tyr Ser Met Glu Gly Pro Ser Ser Arg Lys Gly Glu Lys Phe Val  
Gln Ala Thr Lys Tyr Gly,

wherein \*\*\* indicates a stop codon.

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